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On grassland monocultures Black-tailed Godwits are doomed

Influence of agricultural management on demographic parameters of Black-tailed Godwit chicks and adults in The Netherlands

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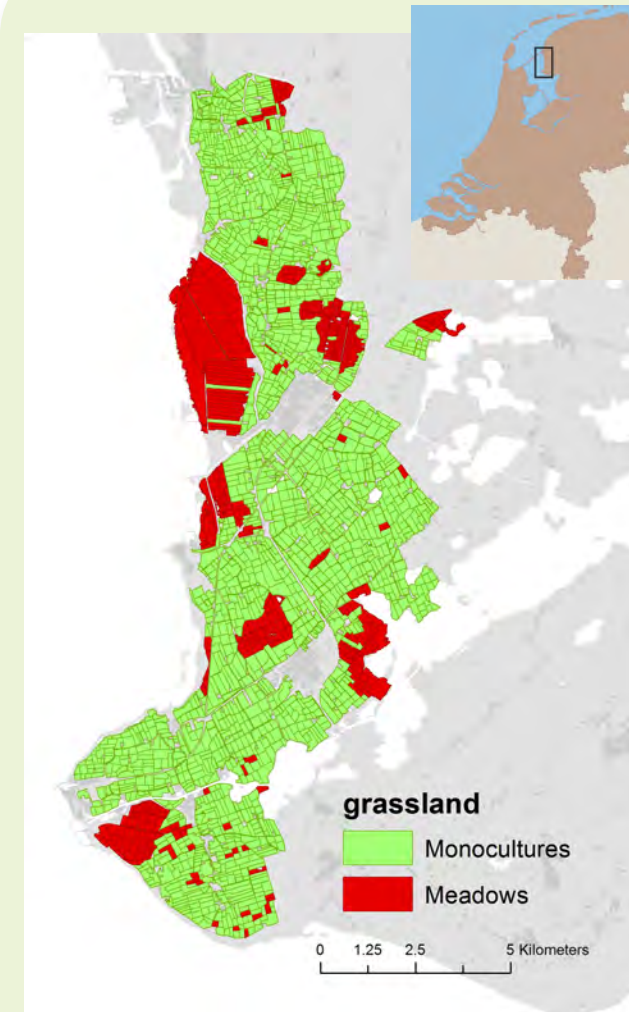
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Introduction:

The number of breeding Black-tailed Godwits (*Limosa limosa limosa*) in The Netherlands is rapidly declining. Most of their breeding habitat - wet herb-rich meadows - has been transformed into intensively used grassland monocultures and arable fields. Will godwits persist in this modern agricultural landscape, what are sources and where are sinks?

We studied the demography of colour ringed godwits in a large study area in The Netherlands between 2007 and 2012. This included the quantification of nest survival, apparent survival of chicks and adults, as well the growth rates of chicks hatched in grassland monocultures compared with herb-rich meadows.



Methods:

Our study area comprised 6000 ha grasslands monocultures, 780 ha arable fields, and 1700 ha herb-rich wet meadows. Between 2007 and 2012, we monitored nests, captured and colour marked adult godwits as well as their 1-day old chicks. Nest survival and apparent survival of adults and juveniles was calculated in MARK. Chick growth was calculated for recaptured chicks of known age and compared with a previously derived Gompertz curve calculated for chicks caught mainly on herb-rich meadows between 1976 and 1985 (Beintema & Visser 1989).

herb-rich meadows

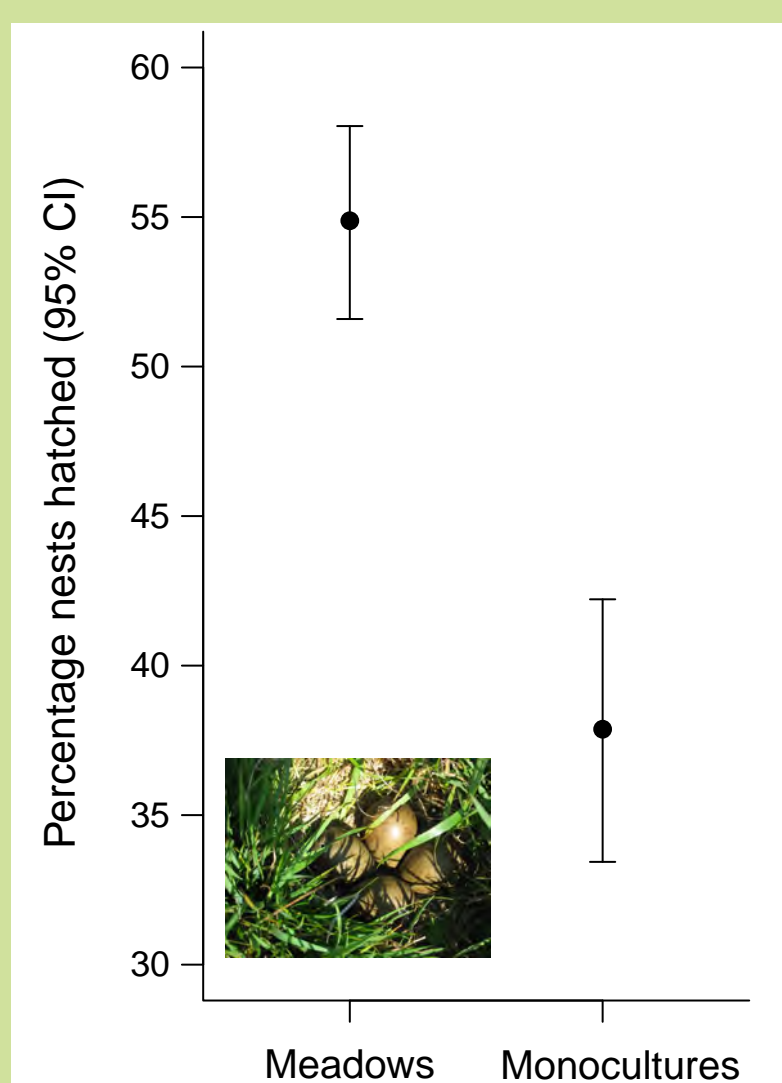


grassland monocultures

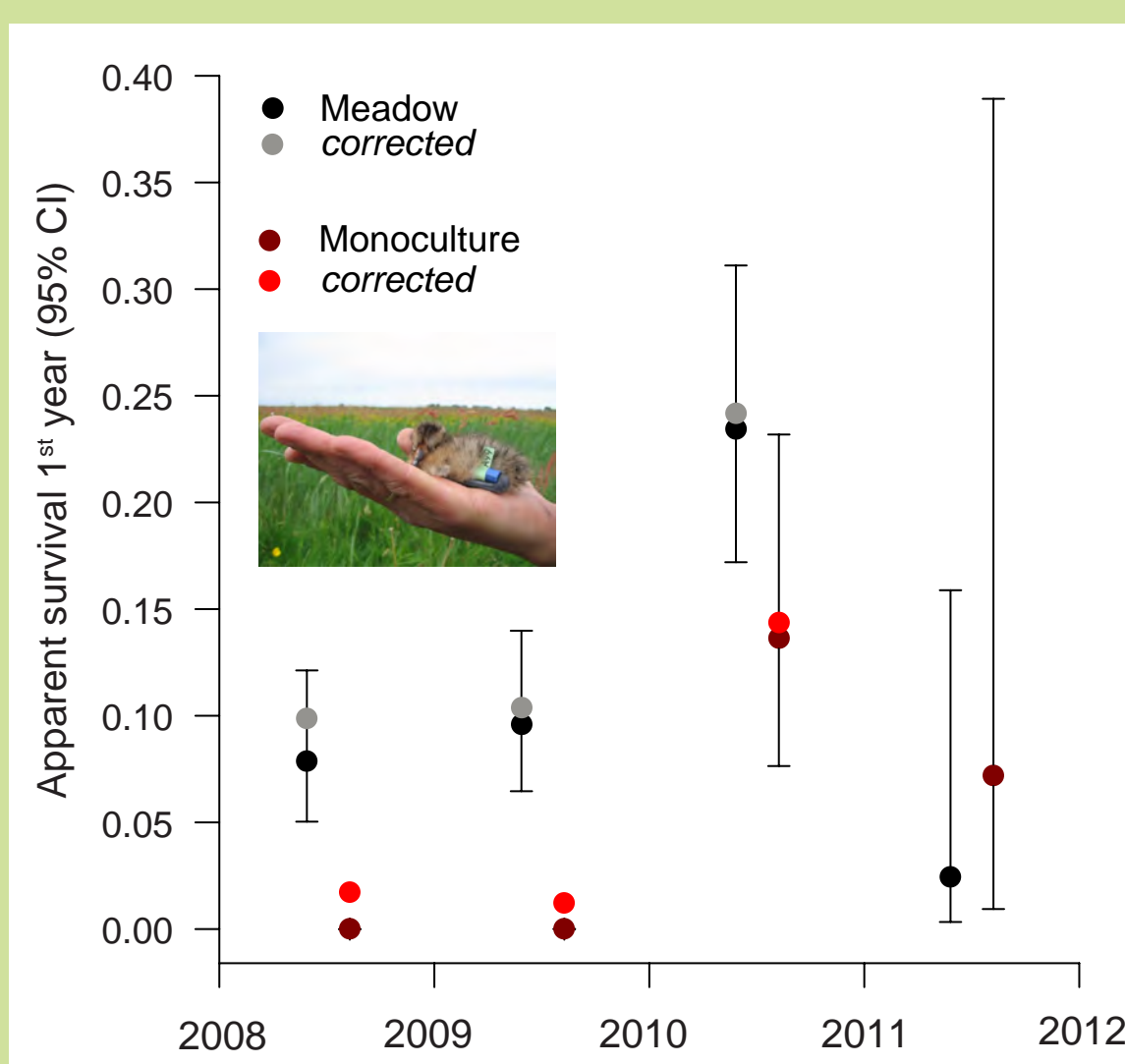


Results:

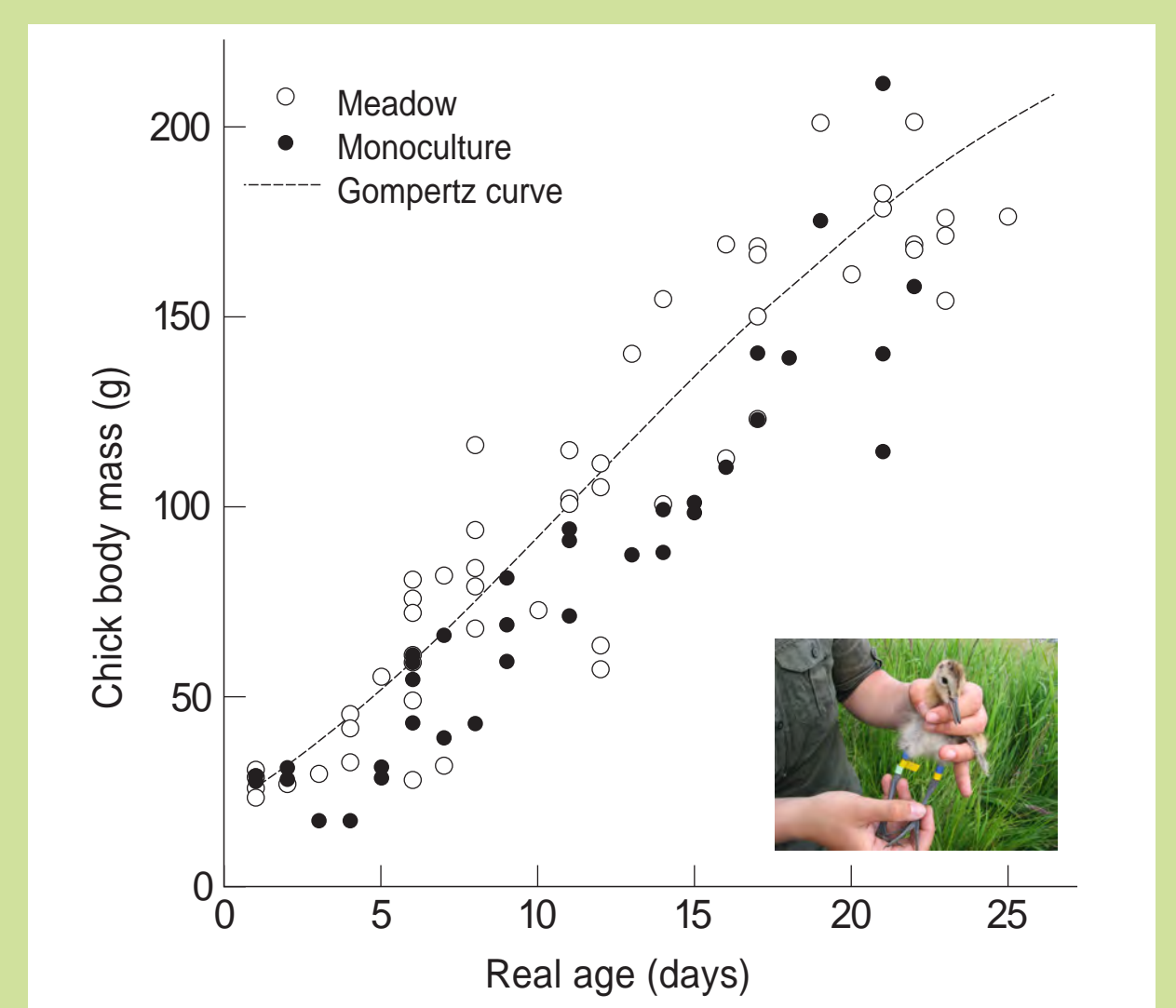
- Nest survival is lower on monocultures than on meadows
- Chick survival is lower on monocultures than on meadows
- Chicks grow slower on monocultures than on meadows
- Chick growth on herb-rich meadows is similar to chick growth of chicks measured between 1976 and 1985



Nests on meadows had a higher hatching success than nests on grassland monocultures. The incubation period was assumed 25 days.



Apparent survival of the first year of godwits is higher for chicks hatched on herb-rich meadows. We corrected for methodological differences because we marked recaptured older chicks with a colour ring combination instead of a numbered flag, which resulted in a higher resighting probability.



Recaptured chicks that hatched on monocultures were lighter than recaptured chicks hatched on meadows, although at hatching there was no difference. Body mass of male fledglings that hatched on monocultures was 16% lighter than that of males hatched on meadows, this difference was 14% for females (Kentie *et al.* 2013).

Discussion:

Less eggs hatch on modern grassland monocultures than on traditional herb-rich meadows, and the chicks that do hatch there have a lower condition and survival rate, than chicks hatched on meadows. With an average yearly adult survival rate of 0.86 (which did not differ between meadows and monocultures), grassland monocultures hold a sink population while herb-rich meadows hold a source population. Conservation effort should focus on creating herb-rich meadows, instead of the popular method of sparing clutches from mowing on grassland monocultures.

acknowledgements:

We thank our fellow members of the successive godwit teams. Nature conservancy organisations (It Fryske Gea and Staatsbosbeheer) and private landowners generously issued permission to access their properties. Volunteers of local bird conservation communities provided locations of many nests. This study was mainly funded by the 'Kenniskring weidevogels' of the former Ministry of Agriculture, nature Management and Food Safety.

References:

- Beintema, A.J. & Visser, G.H. (1989) Growth parameters in chicks of Charadriiform birds. *Ardea*, 77, 169-180.
- Kentie, R., Hooijmeijer, J.C.E.W., Trimbos, K.B., Groen, N.M. & Piersma, T. (2013) Intensified agricultural use of grasslands reduces growth and survival of precocial shorebird chicks. *Journal of Applied Ecology*, 50, 243-251.

